Electric Power

STOPPING WATER POLLUTION AT ITS SOURCE

MISA

[illegible]

ECONOMIC AND FINANCIAL PROFILE OF THE ONTARIO ELECTRIC POWER GENERATION INDUSTRY

SEPTEMBER 1989

Environment
Ontario

Jim Bradley
Minister

ISBN 0-7729-6094-1

ECONOMIC AND FINANCIAL PROFILE
OF THE
ONTARIO ELECTRIC POWER GENERATION INDUSTRY

Municipal-Industrial Strategy for Abatement
(MISA)

Report Prepared by:
Policy and Planning Branch

SEPTEMBER 1989

Copyright: Queen's Printer for Ontario, 1989
This publication may be reproduced for non-commercial purposes
with appropriate attribution.

TABLE OF CONTENTS

Page No.

LIST OF TABLES ii

LIST OF FIGURES iii

ABSTRACT iv

1.0 INTRODUCTION 1
  1.1 Purpose of this Report 1
  1.2 The MISA Program 1
  1.3 Economic & Financial Information Requirements 2

2.0 DEFINITION AND STRUCTURE OF THE SECTOR 4
  2.1 Canadian Utilities 4
  2.2 Ontario Hydro 6
  2.3 Atomic Energy of Canada Limited 10
  2.4 Regulatory Environment and Rate Setting 10

3.0 PRODUCTS 13

4.0 TRENDS IN THE INDUSTRY 19
  4.1 Electricity Costs and Prices 19
  4.2 Industry Outlook 21

5.0 FINANCIAL INFORMATION 23
  5.1 Performance Measures 25

6.0 ENVIRONMENTAL STATUS 29

7.0 CONCLUSIONS 33

REFERENCES 34

APPENDIX 1 35

APPENDIX 2 40

LIST OF TABLES

Table No.	Title	Page No.
1.	Canada's Major Electric Utilities	5
2.	Installed Generating Capacity by Fuel Type, 1987	7
3.	Electricity Production from Different Fuel Types, Ontario and Canada, 1987	13
4.	Ontario Hydro's Total Power Resources, 1987	16
5.	Provincial Electricity Consumption and Generation, 1987	18
6.	Electric Utility Assets, Revenue, Capital Expenditures and Employees, 1986	24
7.	Ontario Hydro's 1987 Compliance Summary for Major Generating Stations as per Provincial Guidelines	30
8.	Ontario Hydro Environmental Performance Summary of Discharges, 1987	32

LIST OF FIGURES

Figure No.	Title	Page No.
1.	Electric Generating Capacity, Ontario and Canada, 1987	8
1A.	Operation of Fossil-Fuelled and CANDU Power Plants	9
2.	Electrical Energy Production, Ontario and Canada, 1987	14
3.	Major Electric Generating Stations, Annual Energy Output (NET), Ontario Hydro, 1982-87	15
4.	Proposed Generating Capacity, Ontario and Canada, 1987-1992	17
5.	Average Annual Rate Increases, 1979-1987	19
6.	Fuel Costs for Electricity Generation, Canada, 1977-1986	20
7.	Debt/Equity Ratio, 1983-1987	26
8.	Interest Coverage Ratio, 1983-1987	26
9.	Net Income (Loss), 1983-1987	28
10.	Cash Flow Coverage, 1983-1987	28

ABSTRACT

- There are 16 major electric utilities in Canada which operate within the jurisdiction of the provinces. Eight of these utilities are provincially owned, two are federal crown corporations, four are privately owned and operated, and two are municipally owned.

- Government-owned utilities in Canada produced about 85 percent of the total electric power generated in 1986, with privately-owned utilities producing 7 percent, and industrial establishments producing the remaining 8 percent.

- In 1986, almost 32 percent of the total electric power generating capacity in Canada was located in Ontario. Nearly 27 percent of the total Canadian electricity output during that year was produced in Ontario.

- Ontario Hydro supplies about 95 percent of the total electricity consumption in Ontario. The Corporation operates seven major electric power generating facilities in Ontario. These facilities account for about 80 percent of the total annual energy output.

- In 1987, Ontario Hydro generated 48 percent of its total electricity production from nuclear plants, 26 percent from hydro-electric dams, and the remaining 26 percent was produced from coal-fired generating stations.

- Annual power rate increases by Ontario Hydro have varied over the past ten years from 4 percent in 1986 to about 10 percent in 1982. The cost increases of supplying electricity are primarily attributed to the expansion of the system and inflation.

- In 1986, industry electric power sales over all of Canada were over $17 billion and industry assets accounted for almost $95 billion.

- Ontario Hydro controls over $31 billion in total assets. In 1987, the Corporation recorded total revenues of $4.8 billion with a net income of $247 million.

- The future of the Canadian electric power generation sector is expected to be positive. Demand for electricity in Ontario is expected to increase by 2.3 percent annually to the year 2000.

- Ontario Hydro generating facilities were in basic compliance with Ontario's environmental guidelines and objectives. The MISA program will set discharge limits for a wider range of contaminants.

1.0 INTRODUCTION

1.1 Purpose of this Report

The purpose of this report is to present a profile of the physical and economic dimensions of the electric power utilities in Canada and Ontario. The focus of this review is the premier electric power utility in Ontario: Ontario Hydro. The profile is intended to provide background information that will be of use in developing monitoring and limits regulations, and evaluating the effects of incremental monitoring and abatement costs.

In addition to data about Ontario Hydro and other electric power utilities in Canada, a brief description of the Atomic Energy of Canada Corporation and its relationship to Ontario Hydro, will be presented. Factors which may have a bearing on the future outlook and long-term viability of the sector are also summarized. Finally, a short review of Ontario Hydro's environmental performance is presented. The electric power generation sector profile report was completed by the Socio-Economics Section of the Ministry. All the data and information used in the report was drawn from publicly available sources.

1.2 The MISA Program

The Municipal-Industrial Strategy for Abatement (MISA) is a major initiative of the Ontario Ministry of the Environment. It is intended to achieve the "virtual elimination of toxic contaminants in municipal and industrial discharges into waterways" (Ontario, Ministry of the Environment, June, 1986:7). To date, MISA regulating will encompass approximately 200 industrial establishments in Ontario which discharge wastewaters directly into provincial waterways and are presently identified to be of greatest concern. In addition, about 400 municipal sewage treatment plants which receive wastewaters from nearly 12,000 industrial plants will be subject to tighter controls under the MISA program.

As described in the "White Paper" (Ontario, Ministry of the Environment, 1986), the MISA program includes:

1. Development of regulations which will specify monitoring requirements;

2. Development of regulations which will specify effluent limits that are based on "best available technology, economically achievable" (BATEA) or on water quality impacts, whichever is more stringent;

3. Implementation of enforcement activities to ensure that specific monitoring and effluent limits are implemented according to program schedules.

Further details on the MISA program can be found in the "White Paper" (Ontario Ministry of the Environment, June 1986).

1.3 Economic and Financial Information Requirements

The monitoring and abatement requirements that may result from this program will likely be costly to achieve and may divert money and effort from other beneficial uses by government and private industry. In recognition of these potential costs, a comprehensive economic assessment program has been initiated to generate an economic data base which can be used to develop estimates of costs of program requirements and evaluate their impacts of these incremental costs on various sectors affected by MISA.

A program of economic studies has been initiated to generate this type of information and to complement technical assessments and regulation development efforts. This program is outlined in a report entitled "Economic Information Needs and Assessments for Developing MISA Monitoring and Abatement Requirements" prepared by the Policy and Planning Branch, Corporate Resources Division, Ontario Ministry of the Environment, March, 1987.

The objectives of the overall economic program are:

(a) to develop an economic data base for those industrial sectors which will be subject to MISA monitoring and effluent limits regulations;

(b) to develop estimates of the costs of proposed monitoring and effluent limits regulations for each industrial sector and for municipalities;

(c) to determine the economic effects and consequences of these costs;

(d) to develop criteria with which to define best available technology, economically achievable;

(e) to design implementation programs that will achieve the MISA goals and objectives at least cost;

(f) to contribute to the design of more effective policies and programs to control sewer uses by industrial dischargers;

Where costs of compliance with MISA monitoring and effluent limits regulations might be particularly high, information about the beneficial consequences of the proposed requirements, including reduced risk of human health effects, will be generated for use in decision-making.

In addition to data about Ontario Hydro and other electric power utilities in Canada, a brief description of the Atomic Energy of Canada Corporation and its relationship to Ontario Hydro, will be presented. Factors which may have a bearing on the future outlook and long-term viability of the sector are also summarized. The electric power generation sector profile report was completed by the Socio-Economics Section of the Ministry. Finally, a short review of Ontario Hydro's environmental performance is presented. All the data and information used in the report was drawn from publicly available sources.

The present report concerns the development of an economic and financial data base for the industrial sectors which will be subject to MISA requirements. In addition to the electric power generation sector, profiles of the following industrial sectors are being prepared.

1. Petroleum refining
2. Organic chemicals
3. Pulp and paper
4. Iron and steel
5. Metal mining and refining
6. Industrial minerals
7. Inorganic chemicals
8. Metal casting

While the information in each profile may ultimately be used to help assess the impacts of monitoring and abatement costs on the various sectors and their constituent firms, such analyses were not an objective of the profile reports and are not presented in them.

2.0 DEFINITION AND STRUCTURE OF THE ELECTRIC POWER GENERATING SECTOR

2.1 Canadian Utilities

The Canadian electric power generating sector (EPGS) consists of 16 major electric utilities across the country operating within the jurisdiction of the provinces. Of these, eight are provincially-owned, two are federal crown corporations, two are municipally-owned and four are privately owned (see Table 1).

In addition, there are about 63 private industrial establishments which generate electricity primarily for their own use. These generators consist of pulp and paper, mining, and aluminum smelting establishments.

In 1987, provincial, federal and municipally-owned utilities produced about 85 percent of the total electricity generated in Canada, private utilities produced 7 percent, and the 63 industrial generating plants produced the remaining 8 percent.

In 1987, hydro sources accounted for 57 percent of the total generating capacity in Canada, followed by coal with 18 percent, nuclear with 12 percent, oil with 8 percent, and natural gas with 5 percent. Almost 70 percent of the installed generating capacity in Canada is attributed to hydro and nuclear sources, for which capital costs are high but operating costs are low. Therefore, a high proportion of electricity prices in Canada consists of interest and depreciation which are based on capital investment.

Canadian electric utility investment in new facilities totalled $6.2 billion in 1987. The industry is highly capital intensive and in terms of capital investment represents about a 1.1 percent share of national gross domestic product (GDP). Electric utility capital investment in Canada accounted for 47 percent of total investment in the energy sector in 1987.

The 16 major electric utilities in Canada employed 91,158 people in 1986 or about 1.0 percent to total Canadian employment in 1986. Ontario Hydro and Hydro-Quebec employed 56 percent of those employees or just over 52,841 persons (see Table 5.1).

The electric power industry in Canada has steadily increased its contribution to the nation's GDP, from 2.7 percent in 1980 to 3.7 percent in 1986. Electric power is playing a more important role in providing Canada with energy supply requirements.

TABLE 1

CANADA'S MAJOR ELECTRIC UTILITIES, 1987

Province	Utility	Ownership	Total Provincial Capacity (MW)
Newfoundland	Newfoundland and Labrador Hydro	Provincial	7402
	Newfoundland Light & Power Co. Ltd.	Private	
Prince Edward Island	Maritime Electric Co. Ltd.	Private	122
Nova Scotia	Nova Scotia Power Corporation	Provincial	2,346
New Brunswick	New Brunswick Electric Power Commission	Provincial	3,490
Quebec	Hydro-Quebec	Provincial	27,644
Ontario	Ontario Hydro	Provincial	32,123
Manitoba	Manitoba Hydro	Provincial	4,137
	City of Winnipeg Hydro-Electric System	Municipal	
Saskatchewan	Saskatchewan Power Corporation	Provincial	2,948
Alberta	Alberta Power Ltd	Private	7,605
	Edmonton Power	Municipal	
	TransAlta Utilities Corporation	Private	
British Columbia	British Columbia Hydro and Power Authority	Provincial	12,508
Yukon*	Northern Canada Power Commission	Federal	123
Northwest Territories	Northern Canada Power Commission	Federal	190
TOTAL FOR CANADA			100,638

* On March 31, 1987, the Yukon assets of the Northern Canada Power Commission were transferred from the federal government to the Yukon government.

Megawatt (MW) = 1,000 kilowatts.

Source: Energy, Mines and Resources Canada, Electric Power in Canada, 1987.

2.2 Ontario Hydro

Ontario Hydro is a crown corporation created by a special statute of the province of Ontario in 1906. Ontario Hydro operates under the authority of the Power Corporation Act and issues no share capital. The primary objective of the Corporation is the provision of electricity at cost with high safety and quality of service standards (Ontario Hydro Statistical Yearbook, 1987).

Management of Ontario Hydro reports to a Board of Directors which in turn reports to the Legislature through the Minister of Energy.

Ontario Hydro is the largest electrical utility in Canada with 30 percent of total Canadian generating capacity in 1987. Hydro-Quebec is the second largest with 28 percent of installed generating capacity while B.C. Hydro is a distant third with 13 percent of total capacity (see Table 2). Almost 80 percent of the total assets in the electric power industry in Canada are owned by these three publicly-owned utilities.

In terms of 1987 total revenues, which reached almost $5.3 billion, Ontario Hydro ranks 11th among Canadian Corporations. In the Canadian energy sector, the Corporation was actually second only to Imperial Oil in terms of sales, in 1987.

Ontario Hydro supplies electricity to over 3 million customers. The corporation operates various types of thermal (coal and oil), nuclear (uranium), and hydro-electric generating stations as well as high voltage transmission lines and associated power distribution facilities.

Ontario Hydro purchases power from Quebec, Manitoba, the United States and some of the 63 industrial generators in the private sector. It sells electric power to the Province's 316 municipal utilities, which, in turn, distribute power to residential, commercial, and industrial customers in their jurisdictions. Ontario Hydro also sells directly to industrial and rural customers not served by municipal utilities as well as to utilities in other provinces and the United States.

In 1987, Ontario accounted for almost 32 percent of the total installed generating capacity in Canada, the largest in the country (see Table 2 below). Ontario Hydro supplies Ontario with about 95 percent of its total electricity consumption.

TABLE 2

INSTALLED GENERATING CAPACITY BY FUEL TYPE, 1986

	Hydro	Coal	Nuclear	Oil	Natural Gas	Total	National Share (%)
				(MW)			
Newfoundland	6,644	0	0	758	0	7,402	7.4
Prince Edward Island	0	20	0	102	0	122	.1
Nova Scotia	386	954	0	1,006	0	2,346	2.3
New Brunswick	903	307	680	1,600	0	3,490	3.5
Quebec	25,849	0	685	1,110	0	27,644	27.5
Ontario	7,764	9,600	10,563	2,673	1,523	32,123	31.9
Manitoba	3,641	442	0	50	4	4,137	4.1
Saskatchewan	830	1,815	0	7	296	2,948	2.9
Alberta	734	4,586	0	80	2,205	7,605	7.6
British Columbia	10,848	0	0	551	1,109	12,508	12.4
Yukon	82	0	0	41	0	123	.1
Northwest Territories	50	0	0	120	20	190	.2
CANADA	57,731	17,724	11,928	8,098	5,157	100,638	100.0

Source: Statistics Canada Publication 57-204.
Energy, Mines and Resources Canada, Electric Power in Canada, 1987

Note: Megawatt (MW) = one unit of bulk power - 1,000 kilowatts

The number of employees including field construction staff at Ontario Hydro increased from 24,123 in 1976 to a peak of 32,654 in 1982. This represents an average annual increase of about 6 percent. However, between 1982 and 1984 the number of employees dropped by about 3,000 before rising again to 32,045 persons in 1986.

Nuclear facilities account for about 33 percent of the total generating capacity in Ontario, followed by coal with about 30 percent and hydro at about 24 percent, as shown in Figure 1 below.

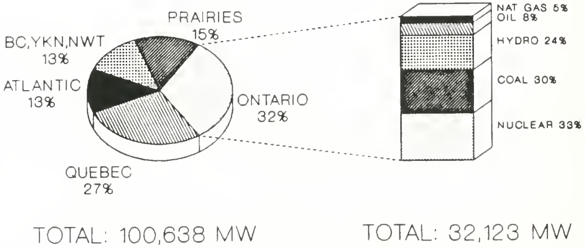


Figure 1

ELECTRIC GENERATING CAPACITY
ONTARIO & CANADA
1987

SOURCE: ENERGY, MINES & RESOURCES CANADA
ELECTRIC POWER IN CANADA, 1986

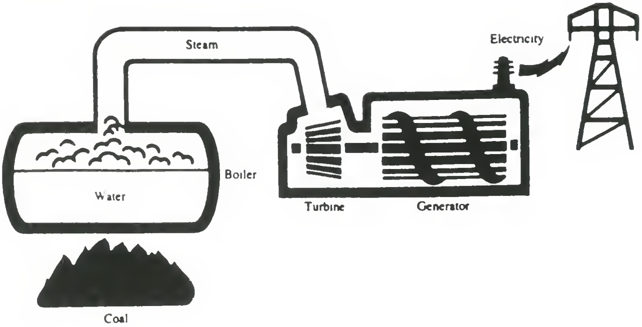
Nuclear and conventional thermal facilities accounted for about 75 percent of the total generating capacity in Ontario. As shown in Figure 1A, a nuclear reactor system transforms the fission energy of uranium into useful heat while a coal-fired generating system transforms chemical energy stored in coal into useable heat.

Ontario Hydro has installed the CANDU (Canada Deuterium Uranium) reactor system at the Bruce, Pickering and Darlington nuclear generating stations. These three nuclear sites, as well as Ontario Hydro's Nuclear Power Demonstration (NPD) station in Rolphton which is shut down, will be subject to MISA regulations.

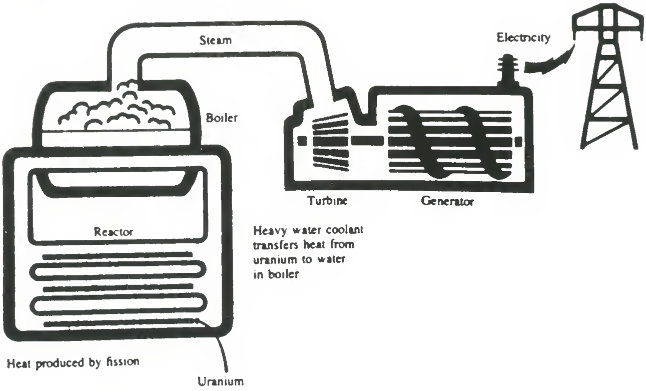
FIGURE 1A

OPERATION OF FOSSIL-FUELLED AND CANDU POWER PLANTS

Fossil-Fuelled



CANDU



Source: Atomic Energy of Canada Limited

2.3 Atomic Energy of Canada Limited

Atomic Energy of Canada Limited (AECL) is a Crown Corporation established in 1952 to "pursue researches and investigations with respect to atomic energy" and to "utilize, cause to be utilized and prepare for the utilization of atomic energy" for the continuing benefit of Canada and Canadians. AECL reports to the federal Minister of Energy, Mines and Resources.

Over the past 30 years, AECL, in cooperation with Ontario Hydro, has designed and developed the Canada Deuterium Uranium (CANDU) reactor system. AECL also markets nuclear engineering products and services to electrical utilities worldwide as well as to domestic producers.

AECL consists of two operating divisions: Research Company and CANDU Operations. Two other divisions: Radiochemical Company and Medical Division - were transferred to the Canadian Development Investment Corporation in 1988 in preparation for privatization.

The Research Company operates major research laboratories at Chalk River Ontario and Whiteshell in Manitoba. These laboratories conduct research in advanced reactor development, waste management, radiation applications and isotopes, and physics and health sciences.

CANDU operations is responsible for the design and marketing of the CANDU nuclear power plant. CANDU Operations designs the systems making up the CANDU nuclear steam supply, tests nuclear components, markets heavy water, manages decommissioned sites and provides comprehensive engineering services to nuclear and non-nuclear clients.

In 1987, AECL generated $268 million in total revenue on consolidated operations which is down from a five year high of $409 million generated in 1983. Net income has fluctuated since 1983, in 1987 the net income was $17 million whereas in 1983 it was $23 million. On the other hand, investments in fixed assets and the value of AECL's total assets have generally been decreasing since 1984. A more detailed five year summary of financial statistics on AECL is presented in Appendix '2'.

2.4 Regulatory Environment and Rate Setting

Electric power utilities are natural monopolies in their service regions. To ensure fair prices and service quality, regulatory boards have been set up in each province to review rates and direct certain activities of electric power utilities.

In Ontario, the Ontario Energy Board (OEB) is the regulatory body to review electricity rate proposals and make recommendations concerning their acceptability. Rate changes proposed by Ontario Hydro are referred to the OEB, through the Minister of Energy, for examination at public hearings. The OEB then makes recommendations about rates and other matters. However, the Board of Directors of Ontario Hydro is authorized to accept or reject the recommendations of the OEB in setting electricity rates.

The process of rate setting begins prior to May 1st of each year when Ontario Hydro forecasts its costs and revenue requirements for the subsequent year. A rate proposal is developed and submitted to the Minister of Energy. Upon the referral to the OEB, a public hearing is scheduled, usually during the month of June. Hydro's financial activities and performance are reviewed in relation to the rate year.

The OEB must report its findings to the Minister by the end of August. In the fall, after considering the OEB's recommendations, Hydro's Board of Directors sets the new electricity rates for the following year effective January 1st.

As noted, the recommendations of the OEB are not binding on Ontario Hydro Board of Directors for setting rates. There have been occasions in the past where Ontario Hydro has not fully accepted the OEB's recommendations on annual rate increases. For example, in 1986, Hydro had proposed a 4.9 percent rate increase for 1987 electricity rates. After conducting a public hearing OEB recommended a higher rate increase of 5.9 percent but Hydro's Board set the rate for 1987 at 5.5 percent. The following year, in 1987, Ontario Hydro proposed a 4.9 percent increase for 1988 rates. The OEB recommended a 3.7 percent increase but the Hydro Board of Directors, at its 1987 October meeting, approved a 4.7 percent rate increase for 1988.

For 1989, Ontario Hydro proposes that electricity rates should increase by an "all customer average" of 5.5 percent. This rate increase would allow the Corporation to recover projected costs and provide for potential expenditures over the forecast period in order to ensure for a smooth pattern of rate increases. The forecast revenue requirement for 1989 is $5,942 million, 8.4 percent or $458 million greater than the projected revenue requirement for 1988. Increases in electricity sales during 1989 are estimated to contribute $148 million while the remaining $310 million will be generated through the proposed 5.5 percent rate increase.

Ontario Hydro is also subject to federal requirements and regulations concerning electricity exports and the operation of its nuclear facilities. The federal National Energy Board (NEB) issues licences for electricity exports from Canada and the Atomic Energy Control Board licences Canadian nuclear facilities that deal with substances and equipment which include uranium, thorium, heavy water, and radioisotopes.

On matters concerning the expansion of generation and transmission facilities, Ontario Hydro is regulated by the provincial Joint Hearing Board. The Board is composed of members from the Environmental Assessment and the Ontario Municipal Boards.

3.0 PRODUCTS

In 1987, hydraulic sources accounted for 65 percent of total electricity production in Canada. The conventional thermal share of total generation was 20 percent and nuclear accounted for the remaining 15 percent of total generation (see Table 3 below).

TABLE 3

ELECTRICITY PRODUCTION FROM DIFFERENT FUEL TYPES, ONTARIO AND CANADA 1987

Fuel Type	Ontario		Canada	
	Production (GW.h)	Share (%)	Production (GW.h)	Share (%)
Hydraulic	34,604	26.3	313,189	65
Coal	32,291	24.5	80,270	16.6
Oil	47	-	8,666	1.8
Natural Gas	1,524	1.2	7,095	1.5
Nuclear	63,116	48	72,888	15.1
TOTAL	131,582	100.0	482,108	100.0

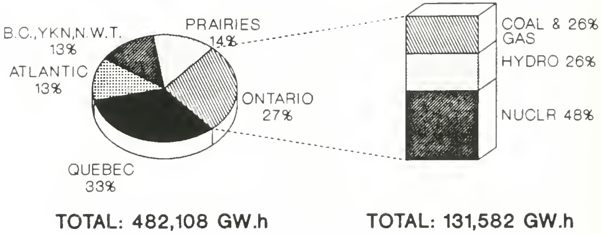
GW.h = Gigawatt-hours = One billion watt hours.

Source: Energy, Mines and Resources Canada, Electric Power in Canada, 1987.

Electricity generation in Canada amounted to 482,108 in 1987. In 1987, electricity production in Ontario amounted to 131,582. In the same year, Ontario used nuclear sources to generate 48 percent of its total electricity production as illustrated in Figure 2 below.

Figure 2

ELECTRICAL ENERGY PRODUCTION
ONTARIO & CANADA
1987



SOURCE: ENERGY, MINES & RESOURCES CANADA
NOTE: GW.h = ONE BILLION WATT HOURS

Between 1960 and 1987, Ontario's power generation grew at an average annual rate of 5.0 percent compared to the national average of 5.5 percent. However, between 1986 electric power generation increased by 5.1 percent which was slightly lower than the 5.8 percent increase registered for all of Canada.

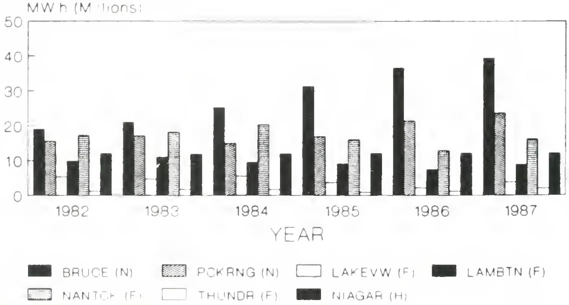
In 1987, total exports of electricity to the U.S., including service exchanges, amounted to 8,497 GW.h or 6.5 percent of Ontario's total production. Ontario was the third largest exporter of electricity in Canada during 1987 accounting for just under 18 percent of the total amount of electricity exported from Canada.

Seven major Ontario Hydro electric power generating facilities listed in Figure 3 account for about 80 percent of the total annual provincial energy output. The Bruce nuclear generating station located near Kincardine in southwestern Ontario produced 31 percent of Ontario Hydro's total electrical energy output in 1987.

As shown in Figure 3, there has been a gradual increase in annual electrical output by nuclear generating stations (N) between 1982-1987, whereas facilities using fossil fuels to produce electricity (F) have generally decreased annual output.

Figure 3

MAJOR ELECTRIC GENERATING STATIONS
ANNUAL ENERGY OUTPUT (NET)*
ONTARIO HYDRO, 1982-1987



*STATION ELECTRICITY SUBTRACTED
eg. IN-HOUSE USE OF ELECTRICITY

N - NUCLEAR
F - FOSSIL
H - HYDRAULIC

SOURCE: ONTARIO HYDRO'S STATISTICAL HANDBOOK 1981-1986

Table 4 shows the generating capacity and production for major Ontario Hydro generating stations. While generating capacity is almost evenly divided between fossil and nuclear facilities, nuclear generating stations accounted for almost 50 percent of Ontario Hydro's total energy output in 1987 while fossil generating stations accounted for only 25 percent of total production.

TABLE 4

ONTARIO HYDRO'S TOTAL POWER RESOURCES - 1987

	Generating Capacity MW	Annual Energy Output (Net)[1] MW.h
Nuclear Generating Stations		
Bruce (near Kincardine) "A" & "B"	6,402.0	39,447,312
Pickering "A" & "B"	4,124.0	23,617,854
Nuclear Power Demonstration (Rolphton)*	0.0	50,867
Douglas Point**	-	-
Total Nuclear Generation	10,526.0	63,116,033
Fossil Generation Stations		
Atikokan	215.0	890,845
Keith (Windsor)	0.0	(1,954)
Richard L. Hearn (Toronto)	0.0	(18,978)
Lakeview (Mississauga)	2,058.0	3,793,893
Lambton (Courtright)	2,100.0	8,881,777
Nanticoke	4,336.0	16,139,908
Thunder Bay	320.0	2,014,649
Combustion Turbine and Diesel-Electric	198.5	11,231
Total Fossil Generation	10,343.5	31,730,911
Hydraulic Generating Stations (by river location)		
Niagara	1,925.0	12,358,127
Welland Canal	88.0	1,181,092
St. Lawrence	707.0	6,971,455
Ottawa	835.0	3,208,135
Madawaska	581.0	815,730
Abitibi	471.0	1,824,359
Mississagi	473.0	433,603
Mattagami	396.0	1,473,377
Montreal	254.0	242,455
Nipigon	249.2	1,066,984
English	139.8	638,994
Other	425.0	1,396,294
Total Hydraulic Generation	6,544.0	31,610,605
TOTAL GENERATION	27,413.5	126,457,549

1. Station electricity service is subtacted, i.e., in-house use of electricity

* Owned by AECL/Ontario Hydro
** Owned by AECL

SOURCE: Ontario Hydro Statistical Yearbook, 1987

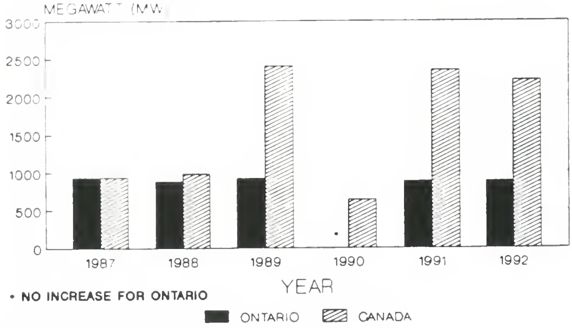
All of the nuclear, fossil fuel and hydro-electric power generating stations listed in Table 4 are being investigated under the Ontario Municipal-Industrial Strategy for Abatement Program.

The major operating fossil fuel power generating stations are: Thunder Bay Thermal Generating Station (TGS), Nanticoke TGS, Lambton TGS, Lakeview TGS, Lennox TGS and Atikokan TGS (two units were operational at the end of 1987). The Keith TGS, Windsor and the Hearn TGS, Toronto are all mothballed.

Between 1987 and 1992, Ontario Hydro proposes to bring on line approximately 1,000 MW of generating capacity each year (except 1990) until 1992, as shown in Figure 4 below. Virtually all of the increases in capacity represented in Figure 4 are attributed to the new Darlington nuclear generating station near Newcastle which is scheduled to start operating in 1989.

Figure 4

PROPOSED GENERATING CAPACITY
ONTARIO & CANADA, 1987-1992
ELECTRIC POWER INDUSTRY



SOURCE ENERGY, MINES & RESOURCES CANADA
ELECTRIC POWER IN CANADA, 1986

During 1987, 438,150 GW.h of electricity were consumed in Canada, an increase of 3.9 percent from 1986. Ontario consumption increased by 4.1 percent in 1987 to 132,174 GW.h which represents about 30 percent of total Canadian consumption. Consumption includes imports net of exports and, therefore, is slightly higher than total generation in 1987. Net imports for 1987 amounts to 592 GW.h.

Electricity consumption in 1987 by province is given in Table 5 along with generation and import/export data. Ontario was second only to Quebec in generation and consumption during 1987.

In 1987, six provinces exported electricity to the United States: New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and British Columbia. In terms of export revenue, Ontario was the third largest earner in 1987, accounting for 18 percent of the $1,210 million in export revenue. Quebec was the largest earner accounting for 37 percent of the total export revenue.

TABLE 5

PROVINCIAL ELECTRICITY CONSUMPTION AND GENERATION, 1987

Province	Generation	Imports From		Exports To		Consumption	Provincia Share (%)
		Provinces	U.S.*	Provinces	U.S.*		
			(GW.h)				
Newfoundland	40.090	0	0	30,393	0	9,697	2.2
Prince Edward Island	164	483	0	0	0	647	.1
Nova Scotia	7,749	659	0	82	0	8,326	1.9
New Brunswick	12,493	6,922	266	1,164	6,141	12,376	2.8
Quebec	156,952	30,427	0	12,782	16,401	158,196	36.1
Ontario	131,582	6,992	2,113	16	8,497	132,174	30.2
Manitoba	19,902	1,220	512	2,311	3,461	15,862	3.6
Saskatchewan	12,440	1,262	84	1,222	113	12,451	2.8
Alberta	36,770	526	2	710	0	36,588	8.4
British Columbia	63,067	710	493	521	12.815	50,934	11.6
Yukon/Northwest Territories	899	0	0	0	0	899	.2
CANADA	482,108	49,201	3,470	49,201	47,428	438,150	100.0

* Service exchanges are included (electric power is traded between borders without payment).

Source: Electrical Energy Branch
Energy, Mines and Resources Canada, Electric Power in Canada, 1987

4.0 TRENDS IN THE ELECTRIC POWER INDUSTRY

4.1 Electricity Costs and Prices

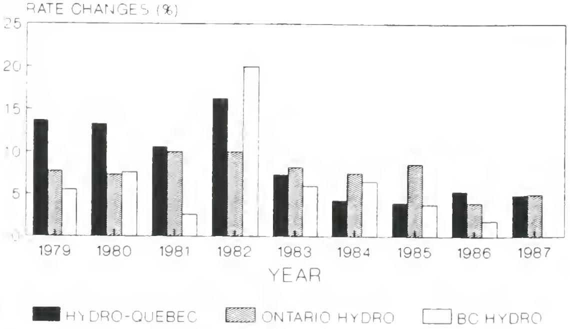
The unit cost of supplying additional electricity has increased rapidly since 1974 through to 1982. This was due to the high rate of inflation and the increased cost of fossil fuels during this period (Electric Power in Canada, 1987).

Electricity production and delivery costs, which determine the ultimate prices to consumers, differ from one service area to the next based on the mix of primary generation facilities, provincial regulations, and the size and geographic distribution of the population being serviced.

Figure 5 below illustrates the average annual power rate or price increases for customers of Hydro-Quebec, Ontario Hydro and B.C. Hydro, the three major electric utilities in Canada, over the period 1979-87. It is apparent that Ontario Hydro's Annual Average rate changes have been less volatile than was the case for Hydro-Quebec and B.C. Hydro. Rate increases set by these jurisdictions have varied by almost 20 percent from year to year. In 1987, Ontario Hydro increased its average rates by 5.0 percent which was slightly higher than the 4.1 percent increase registered by the CPI between 1986 and 1987.

Figure 5

AVERAGE ANNUAL RATE INCREASE
MAJOR ELECTRIC UTILITIES

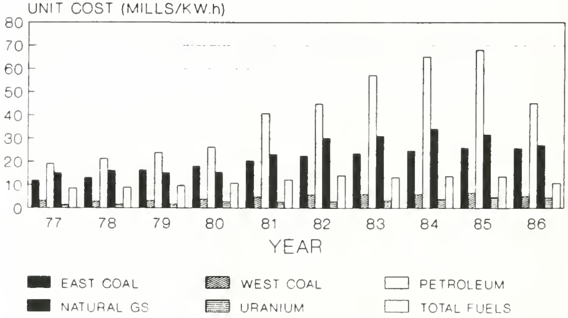


SOURCE: ENERGY, MINES & RESOURCES CANADA
ELECTRIC POWER IN CANADA 1987

Over the past 10 years, nuclear-generated electricity has had the lowest unit fuel cost in Canada as shown in Figure 6 below. In 1986, fuel costs for nuclear generated electricity came to 4.5 mills per KW.h as compared with 45 mills for petroleum, 27.1 for natural gas, and 5.13 mills for western coal.

Figure 6

FUEL COSTS FOR ELECTRICITY GENERATION CANADA, 1977-1986



SOURCE CALCULATED FROM ELECTRIC POWER STATISTICS STATISTICS CANADA CAT # 57-202

For Canada as a whole, the average unit fuel cost per KW.h of electricity generated from all types of fossil fuels increased by about 1.3 times between 1977 and 1986, from 8.4 to 10.7 mills. The increase in cost of fuel from oil generation was much more dramatic, growing from 19.0 mills to 45.15 mills, more than doubling during the same period.

The unit cost of coal used to generate electricity varies among regions in Canada and depends on type of coal used and its source. The unit fuel cost of electricity generated from both western and eastern coal more than doubled between 1977 and 1986.

4.2 Industry Outlook and Demand Growth

Canada

Future electricity demand is sensitive to changes in national and provincial economic activity as well as power rates. Other factors which affect growth in electricity demand include the price of alternative energy sources, population growth, size of the housing stock and conservation efforts.

In 1984, the quantity of electricity demanded in Canada totalled 386,000 GW.h. hours. According to the National Energy Board (NEB), the quantity of electricity demanded is projected to grow steadily by 2.6 percent annually to a level of about 660,000 GW.h. hours in 2005.

As a result of rising domestic electricity consumption as well as growing U.S. demand for power imports from Canada, generating capacity was forecast by NEB to grow from 90 gigawatts in 1984 to about 140 gigawatts by 2005 (National Energy Board, 1986).

In recent years, excess generating capacity over and above consumption and reserve capacity is expected to be utilized within the domestic as well as the export markets in the short term.

The Canada-U.S. Free Trade Agreement will have little effect on the Canadian electric power sector because there are no tariffs on electricity imports into either country.

The NEB expects Canadian utilities to continue to provide reliable supplies of electricity up to the year 2005 without supply shortfalls or major price increases. The Canadian utility industry expects that electricity prices will remain generally stable in real terms (inflation adjusted) over the period 1984 to 2005.

Ontario

According to the Ministry of Energy (1987), electricity consumption in Ontario is expected to grow by 2.3 percent annually to the year 2000 while economic activity in Ontario has been forecast to grow by 3.2 percent per year to the year 2000.

Annual consumption growth of 2.3 percent is significantly lower than electricity consumption increases experienced over the last four years. Factors contributing to the expected reductions in electricity demand in Ontario during the 1990's include: an aging population, reduced economic growth, lower demand for new housing, lower growth of electricity-intensive sectors, and new technologies which are more energy-efficient. Finally, declines in oil and natural gas prices since 1985 have induced certain end uses, such as space heating, to substitute away from electricity.

On the other hand, Ontario Hydro forecasts electricity consumption to grow at a slightly higher annual rate of about 2.7 percent over a shorter 1988-1991 period to a level of 140,500 GW.h. by 1991.

The expected growth in electricity reflects Ontario Hydro's demand management policy initiatives for electricity efficiency which include strategic conservation, peak load shifting, changes in rate structure, and the promotion of parallel generation. The Corporation anticipates reductions in capacity requirements of approximately 3,000 MW by the year 2000 resulting from new demand-side management options.

5.0 FINANCIAL INFORMATION

The Canadian electric power industry controlled total assets of about $94 billion in 1986. As shown in Table 6, there were more than 91,000 directly employed by the industry in 1986 or about 1.0 percent of total Canadian employment. Ontario Hydro, Hydro-Quebec, and B.C. Hydro are the three largest electric utilities in Canada in terms of assets. In terms of assets, revenue, capital expenditures and employees, Ontario Hydro ranks first among all Canadian electric utilities.

In 1986, Ontario Hydro generated $4.8 billion in total revenues. This is slightly more than the $4.7 billion generated by Hydro-Quebec. These two utilities generate about 56 percent of the total revenue from electricity sales for all provinces. Ontario Hydro employed 32,045 people or slightly more than 35 percent of the total workforce of the Canadian electric power industry in 1986.

Ontario Hydro's capital expenditure of $2.6 billion during 1986 amounted to about 43 percent of the total capital investment for this industry. Most of this expenditure was allocated to construction of the Darlington nuclear power station. Hydro-Quebec had the second largest capital expenditure in Canada totalling $1.7 billion in 1986.

During the period 1982-1986, Ontario Hydro's financial position has remained strong. Growth in total revenues has averaged 10.8 percent annually, while total operating costs have only increased by an average of 5.6 percent over the same period.

On the other hand, total financing charges have more than doubled over the 1982 to 1986 period, increasing by an average of 35 percent each year. Financing charges include interest and foreign exchange components. The interest charged represents the total cost of borrowing, less interest capitalized. Foreign exchange charges represent the recovery of costs arising from changes in the value of the Canadian dollar relative to foreign currencies, since the debt was incurred.

Ontario Hydro invests in fixed assets to meet expected growth in the demand for electricity, to replace existing assets, and to meet regulatory requirements. Investment in fixed assets over the 1982 to 1986 period averaged about $2.6 billion annually. Major portions of the annual capital expenditures went towards the construction of new generating facilities and replacement of existing assets with facilities that are more efficient and technically advanced.

TABLE 6

CANADIAN ELECTRIC UTILITY ASSETS, REVENUE, CAPITAL EXPENDITURES AND EMPLOYEES, 1986

Utility	Assets	Revenue	Capital Expenditure	Employees
		($ millions)		(persons)
Newfoundland and Labrador Hydro	2,095	321	28	1,333
Newfoundland Light & Power Co. Ltd.	367	245	33	905
Maritime Electric Co. Ltd.	91	54	9	203
Nova Scotia Power Corporation	1,475	476	124	2,383
New Brunswick Electric Power Commission	2,830	825	80	2,521
Hydro-Quebec	30,588	4,734	1,688	20,796
Ontario Hydro	31,357	4,853	2,638	32,045
Manitoba Hydro	3,240	570	319	4,142
City of Winnipeg Hydro-Electric	111	84	N/A	643
Saskatchewan Power Corporation*	2,857	847	134	3,181
TransAlta Utilities	3,700	916	164	2,527
Edmonton Power	954	271	191	846
Alberta Power Ltd.	1,338	375	133	1,371
BC Hydro and Power Authority*	9,802	1,987	141	6,393
Northern Canada Power Commission	143	99	17	322
All minor utilities	375	700	N/A	11,547
Canada	94,698	17,357	5,541	91,158

Source: Energy, Mines and Resources Canada, Electric Power in Canada, 1987

A detailed five year sumary of financial statistics on Ontario Hyro is presented in Appendix '1'.

5.1 Performance Measures

Ontario Hydro's financial performance statistics are reviewed for the period 1983-1987. Ontario Hydro's main financial indicators include debt equity, cash flow, and interest coverage ratios and net income (refer to Appendix 1).

The debt-equity ratio is equal to total debt divided by the sum of debt and equity. The debt-equity rates generally indicates the proportion of Hydro's assets financed by debt as opposed to net income charges contributed by customers over the years. In 1986, Canadian publicly owned electric utilities had debt-equity ratios ranging from 72 percent for Winnipeg Hydro to about 96 percent for Manitoba Hydro and Nova Scotia Power. The debt-equity ratios for investor-owned utilities (which are mostly made up of U.S. companies) ranged from 42 percent to 45 percent (Energy, Mines and Resources Canada). High debt-equity ratios, similar to those of Canadian publicly-owned utilities, were also common among publicly-owned utilities in the U.S. (Energy, Mines and Resources Canada). The ratios for these U.S. utility companies ranged from 72 percent to 100 percent. Figure 7 shows that Ontario Hydro has achieved virtually constant debt to equity ratios over the past five years, ranging from slightly above 83 percent in 1982 to just about 84 percent in 1986.

The interest coverage ratio is defined as net income plus interest on bonds, notes, and other debt divided by interest on bonds, notes, and other debt. The higher the ratio, the greater the Corporation's ability to meet its interest and debt repayment obligations. Figure 8 shows the level of interest coverage for the period 1983 to 1987. Ontario Hydro's interest coverage decreased from 1.25 in 1984 to 1.09 in 1986 than increased to 1.1 in 1987. The decreases in the interest coverage ratio has had no effect on Hydro's ability to meet its interest and debt obligations (Ontario Hydro Statistical Yearbook, 1987).

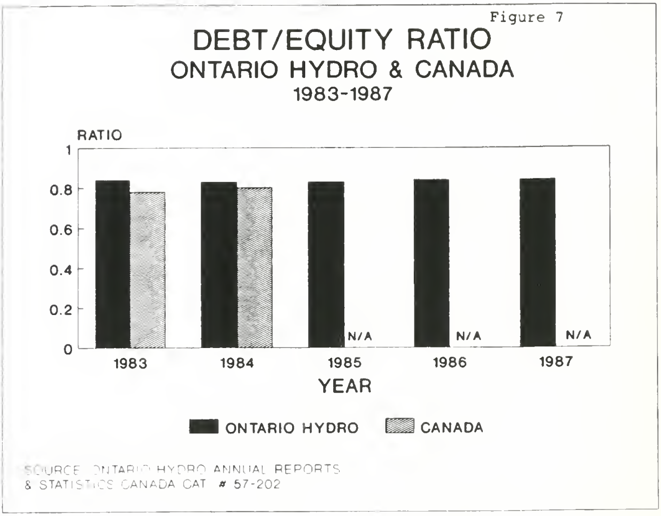


Figure 7

DEBT/EQUITY RATIO
ONTARIO HYDRO & CANADA
1983-1987

SOURCE ONTARIO HYDRO ANNUAL REPORTS
& STATISTICS CANADA CAT # 57-202

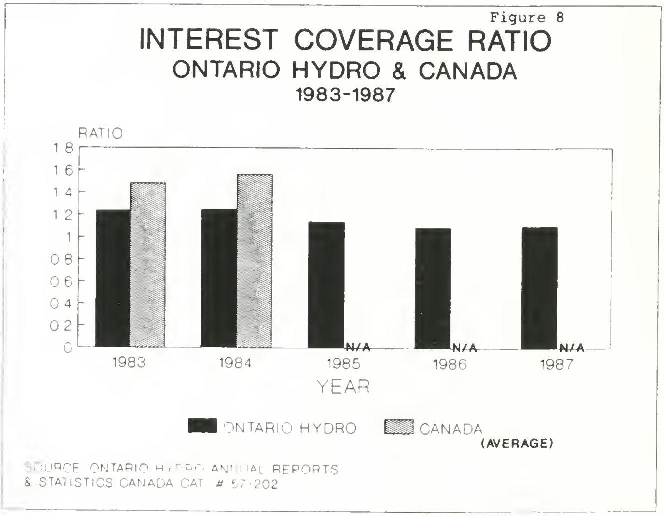


Figure 8

INTEREST COVERAGE RATIO
ONTARIO HYDRO & CANADA
1983-1987

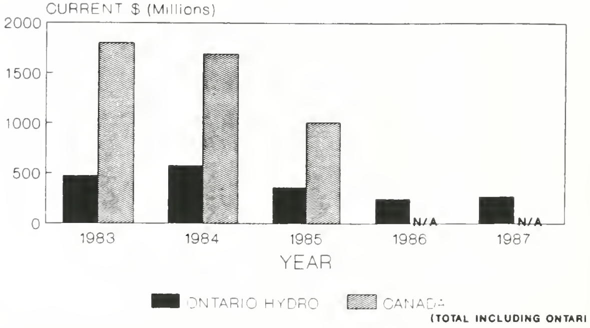
SOURCE ONTARIO HYDRO ANNUAL REPORTS
& STATISTICS CANADA CAT # 57-202

Net Income is the surplus remaining after all current expenses and charges of the year except non-recurring, "extraordinary" items are deducted from revenue. Positive net income over several years is a primary indicator of the health of a company and an industry. As required by the Power Corporation Act, Hydro's net income is allocated between an appropriation for debt retirement and a reserve for stabilization of rates and contingencies. Net income represents a source of funds for the corporation which, along with other sources of cash, is invested in assets and thus reduces debt which could otherwise be incurred. Figure 9 shows that Ontario Hydro experienced a peak in its recorded net income during 1984. Net Income for Ontario Hydro and other Canadian utilities increased during 1986 and 1987.

Cash flow coverage ratio represents funds provided from operations plus net interest, and interest charged to fuel for electric generation less interest on accrued provisions divided by interest on bonds, notes, and other debts. A higher ratio indicates the Corporation's ability to meet its obligations and commitment. Figure 10 shows that Hydro's cash flow coverage for 1987 was at its highest level since 1982. There has been a steady increase in the ratio during the period 1982 to 1987.

Figure 9

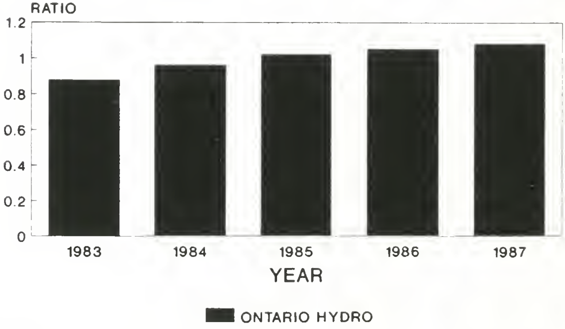
NET INCOME (LOSS)
ONTARIO HYDRO & CANADA
1983-1987



SOURCE: ONTARIO HYDRO ANNUAL REPORTS
& STATISTICS CANADA CAT # 57-202

Figure 10

CASH FLOW COVERAGE
ONTARIO HYDRO
1983-1987



SOURCE: ONTARIO HYDRO ANNUAL REPORTS

6.0 ENVIRONMENTAL STATUS

The Province of Ontario sets effluent guidelines or specific requirements for industrial discharges. Provincial guidelines have been established for the electric power generating sector for the following parameters: suspended solids, pH and temperature.

Ontario Hydro asserts that all of their facilities are designed and operated such that effluent discharges are controlled with the intent of achieving Provincial guidelines. Table 7 shows that, of the major Ontario Hydro facilities listed, all were in compliance with annual averages of discharge requirements during 1986. However, Ontario Hydro's Thermal Generating Stations (TGS) in Nanticoke and Courtright were not in compliance with monthly averages of discharge requirements in 1986. Although the Lambton TGS cooling water discharge exceeded the change-in- temperature guideline by 0.6 degrees celsius for 6 hours in January 1986, it met applicable daily average limits. The Nanticoke TGS ash lagoon exceeded the Provincial guidelines for suspended solids loadings in May 1986. The exceedance was caused by on-going construction in the settling pond system. The ash lagoon discharge frequently exceeded the pH limit due to the alkaline nature of the ash from Western Canadian coal.

In terms of radioactive emission standards (air and water), the International Commission on Radiological Protection recommends radiological dose limits for the general public. These standards have been adopted by the Atomic Energy Control Board (AECB) as regulatory limits. Ontario Hydro derived radioactive emission limits for each nuclear generating station (NGS) which are more stringent than the adopted AECB's regulatory limits. These Derived Emission Limits (DEL) have been approved by AECB for each operating Ontario Hydro facility. Ontario Hydro's standard operating limit for all radiological emissions from NGS is set at approximately 1 percent of the DEL for all radionuclide groups.

According to Ontario Hydro, almost all NGS and the Radioactive Waste Operations Site (RWOS) met the annual radiological emission standard of 1 percent of the DEL for all radionuclide groups in 1986. The only exception was the Nuclear Power Demonstration NGS on the Ottawa River where noble gas emissions were 1.9 percent of the DEL. Ontario Hydro has since taken measures to reduce the noble gas emissions at the nuclear facility.

TABLE 7

Ontario Hydro's 1986 Compliance Summary for Major Generating Stations as per Provincial Guidelines

Facility	Monthly	Annual
Tiverton:		
. Domestic Treatment Plant	X	X
. Heavy Water Plant	X	X
. Thermal Data Stations A & B	X	X
Nanticoke:		
. Thermal Generating Station (TGS)	NIC	X
. Thermal Data	X	X
Toronto:		
. Lakeview TGS	X	X
Courtright:		
. Lambton TGS	NIC	X
Thunder Bay:		
. Thunder Bay TGS	X	X
Pickering:		
. Pickering	X	X

X - In Compliance

NIC - Not in Compliance

Source: Ontario Ministry of the Environment, Report on the 1986 Industrial Direct Discharge in Ontario, Queen's Printer for Ontario, 1987.

Thermal emission standards are based on Ministry of the Environment (MOE) guidelines. In 1986, thermal emissions from all facilities were within the guidelines for effluent temperature rise and effluent temperature. The daily mean temperature rise guideline was exceeded on two occasions at the Nuclear Power Demonstration NGS. The daily average temperature rise on October 6, 1986 increased to 12.6 degrees Celsius and on October 7, 1986, the average was recorded at 11.5 degrees Celsius.

Table 8 shows a summary of environmental performance parameters for Ontario Hydro's TGS and NGS to MOE water quality guidelines and objectives. In 1986, all thermal stations were in compliance 100 percent of the time with MOE pH objectives, except for the Lakeview TGS ash plant which was in compliance 98 percent of the time and the Nanticoke ash lagoon which was only in compliance 40% of the time. All thermal stations, except for the Thunder Bay TGS ash plant, were in compliance 90 percent or more of the time with Provincial objectives for suspended solids. The Thunder Bay TGS ash plant was only in compliance about 79 percent of the time in 1986, the lowest of all thermal facilities. In 1986, there was generally a high degree of compliance for temperature for TGS and NGS facilities.

Overall, Ontario Hydro generating facilities have met the present Provincial guidelines or requirements for the few parameters that are currently monitored regularly. Under the MISA program, it is intended to set discharge limits for a wide variety of other contaminants. During the first year of the program, monitoring data and activities of Ontario Hydro will be audited by MOE personnel to determine levels of compliance and operations efficiency.

TABLE 8

Ontario Hydro
Environmental Performance Summary of Discharges
1986

Facility	Monitored Parameter (% Compliance)			
	pH	Suspended Solids	Temperature Delta T	Te
Lakeview TGS				
- ash plant	98	90	N/A	N/A
- CCW outfall	100	100	99.8	100
Lambton TGS				
- ash plant	100	100	N/A	N/A
- CCW outfall	100	100	99.9	100
Thunder Bay TGS				
- ash plant	100	78.8	N/A	N/A
- CCW outfall	100	96.2	100	100
Nanticoke TGS				
- ash lagoon	40	91.4	N/A	N/A
- CCW outfall	100	100	99.8	100
NPD NGS	ND	ND	99.5	100
Pickering NGS A	ND	ND	99.8	100
Pickering NGS B	ND	ND	99.8	99.1
Bruce NGS A	ND	ND	99.6	100
Bruce NGS B	ND	ND	99.9	100
BHWP	ND	ND	100	100

N/A - Not Applicable
ND - No Data Available
CCW - Condenser Cooling Water Outfall
Delta T - Temperature Rise between Intake and Outfall
Te - Outfall Effluent Temperature

pH and Suspended Solids are measured by weekly grab samples
Temperature is measured continuously, reported as hourly averages

---

Source: Ontario Hydro, Environmental Protection Central Thermal Services.

7.0 CONCLUSIONS

An important feature of the electric power sector is a highly capital intensive infrastructure which is largely financed by long-term debt. In terms of capital investment and employment, the industry has a significant presence within the Canadian economy. Because the firms in the sector are regulated monopolies financial health of the sector is generally good.

Future growth and demand in electricity are sensitive to national and economic factors. Forecasting the demand for electricity has become difficult in recent years largely due to unstable alternatives energy prices such as oil and gas, causing uncertainty about electricity demand in the industry.

The National Energy Board expects Canadian utilities to continue to provide reliable supplies of electricity up to the year 2005 without supply shortfalls or major price increases. Electricity consumption in Ontario is expected to grow moderately, below the projected economic growth in Ontario, up to the year 2000.

Ontario Hydro generating facilities have generally compiled with provincial guidelines or requirements for the relatively few parameters that are presently monitored. As the MISA program evolves, the Ministry will set and monitor discharge limits for a wide variety of other contaminants.

REFERENCES

Atomic Energy of Canada Limited, Canada's Nuclear Expertise, 1987.

Department of Energy, Mines and Resources, The Canada-U.S. Free Trade Agreement and Energy, Minister of Supply and Services Canada, 1988.

Energy, Mines and Resources Canada, Electric Power in Canada, 1985-1987.

Energy, Mines and Resources Canada, April 1986, Energy Information Handbook.

National Energy Board, Canadian Energy Supply and Demand 1985-2005, Minister of Supply and Services Canada, October 1986.

Ontario Minstry of Energy, Ontario's Future Electricity Demand, Queen's Printer for Ontario, 1987.

Ontario Hydro, Financial Planning Department, Financial Forecast 1988-1991.

Ontario Hydro, Submission on 1989 Electricity Rates, April 1988.

Ontario Hydro's Board of Directors, Ontario Hydro Annual Reports, 1976-1987.

Ontario Hydro's Board of Directors, Ontario Hydro Statistical Yearbook, 1976-1986.

Ontario Hydro, Radioactivity Management and Environmental Protection Department, NGD Annual Environmental Summary, May 1987.

Ontario Ministry of the Environment, Report on the 1986 Industrial Direct Discharges in Ontario, Queen's Printer for Ontario, 1987.

Statistics Canada Publication, 1985, Electricity Bills for Domestic, Commercial and Small Power Service, Cat. 57-203.

Statistics Canada Publication, Electric Power Statistics, Volume II - Annual Statistics, Cat. 57-202, 1975-1984.

APPENDICES

APPENDIX 1

ONTARIO HYDRO'S FIVE YEAR SUMMARY OF FINANCIAL STATISTICS
($ Millions)

Income Statement	1987	1986	1985	1984	1983	1982
Revenues						
Primary Power and Energy						
- Municipal Utilities	3,441	3,116	2,891	2,555	2,265	1,997
- Rural retail customers	968	885	815	712	644	576
- Direct Industrial Customers	675	604	568	516	448	395
	5,084	4,605	4,274	3,783	3,357	2,968
Secondary Power and Energy	196	248	351	429	448	419
TOTAL SALE REVENUES:	5,280	4,853	4,625	4,212	3,805	3,387
Less: Operating Expenses						
- operation, maintenance, administration	1,150	1,014	966	884	952	854
- fuel and for electric generation	1,124	933	968	1,036	978	902
- water rentals	90	91	87	61	28	0
- power purchased	117	128	163	149	126	127
- nuclear agreement-payback	(23	(63)	(75)	(36)	(37)	65
- depreciation	723	705	655	476	396	348
TOTAL OPERATING EXPENSES:	3,181	2,808	2,764	2,570	2,517	2,296
INCOME BEFORE FINANCING CHARGES:	2,099	2,045	1,861	1,642	1,288	1,091
Financing Charges						
- Gross interest	2,744	2,684	2,551	2,322	2,012	1,708
- Capitalized interest	(978)	(1,038)	(1,166)	(1,293)	(1,194)	(968)
- Investment income	(64)	(61)	(60)	(80)	(58)	(67)
- Foreign exchange	126	213	176	118	56	70
Less						
TOTAL FINANCING CHARGES:	1,828	1,798	1,501	1,067	816	743

Income Statement	1987	1986	1985	1984	1983	1982
Net Income	**271**	**247**	**360**	**575**	**472**	**348**
Source and Use of Cash						
- Cash from operations	1,204	1,040	1,055	1,088	950	686
- Cash from financing	1,330	1,710	757	1,756	1,823	2,172
- Cash used for investment in fixed assets	2,452	2,585	2,644	2,539	2,668	2,690

ONTARIO HYDRO'S FIVE YEAR SUMMARY OF FINANCIAL STATISTICS

($ Millions)

Balance Sheet	1987	1986	1985	1984	1983	1982
ASSETS						
Fixed Assets						
- Fixed Assets in Service	25,788	23,312	20,604	17,215	14,655	13,074
- Less accumulated depreciation	5,581	4,946	4,614	4,069	3,606	3,187
	20,207	18,366	15,990	13,146	11,049	9,887
- Construction in progress	7,779	7,737	8,159	9,001	8,899	7,713
TOTAL FIXED ASSETS	27,986	26,103	24,149	22,147	19,948	17,600
Current Assets						
- Cash and temporary investment	215	285	18	658	358	452
- Accounts Receivable	584	543	550	442	471	364
- Fuel for electric generation (inventory)	1,039	1,065	1,015	973	759	802
- materials and supplies, at cost	287	281	215	179	191	199
TOTAL CURRENT ASSETS	2,125	2,174	1,798	2,252	1,779	1,817
Other Assets						
- Unamortized debt costs	940	1,597	1,897	1,447	80	59
- Unamortized advances for fuel supplies	777	884	899	883	894	759
- Unamortized deferred costs	473	283	313	358	399	395
- Long-term accounts receivable and other assets	356	316	264	214	94	91
TOTAL OTHER ASSETS	2,546	3,080	3,373	2,902	1,467	1,304
TOTAL ASSETS:	32,657	31,357	29,320	27,301	23,194	20,721
Liabilities						
Long term debt	23,862	23,494	22,518	20,659	17,977	15,882

Balance Sheet	1987	1986	1985	1984	1983	1982
Current Liabilities						
- Accounts payable and accrued charges	624	473	549	616	526	562
- Short-term notes payable	502	255	223	49	26	113
- Accrued interest	705	742	710	672	579	521
- Long-term debt payable within 1 year	1,202	1,076	407	847	263	449
TOTAL CURRENT LIABILITIES	3,033	2,546	1,889	2,184	1,394	1,645
Other Liabilities						
- Long-term accounts payable and accrued charges	183	136	158	152	166	81
- Accrued irradiated fuel disposal and fixed asset removal costs	617	490	311	222	148	75
TOTAL OTHER LIABILITIES	800	626	469	374	314	156
Equity						
- Equities accumulated through debt retirement appropriations	3,229	2,910	2,618	2,366	2,156	1,971
- Reserve for stabilization of rates and contingencies	1,606	1,654	1,699	1,591	1,226	940
- Contributions from the Province of Ontario as assistance for rural construction	127	127	127	127	127	127
TOTAL EQUITY	4,962	4,691	4,444	4,084	3,509	3,038
	32,657	31,357	29,320	27,301	23,194	20,721
Other Measures						
Capital Expenditures	2,524	2,523	2,541	2,624	2,746	2,885
Working Capital	(908)	(372)	(91)	68	385	172

Balance Sheet	1987	1986	1985	1984	1983	1982
Financial Ratios:						
- Working Capital Ratio	.70	.85	.95	1.03	1.28	1.11
- Quick Asset Ratio	.36	.44	.41	.59	.73	.62
- Debt/equity	.84	.84	.83	.83	.84	.85
- Interest Coverage	1.10	1.09	1.14	1.25	1.24	1.2
- Rate of Return on Total Assets	9.2%	9.3%	9.9%	10.6%	10.7%	9.9%
- Cash Flow Coverage	1.08	1.05	1.02	.96	.88	.89

Source: Ontario Hydro Annual Reports

APPENDIX 2

ATOMIC ENERGY OF CANADA LIMITED
FIVE YEAR SUMMARY OF FINANCIAL STATISTICS
CONSOLIDATED OPERATIONS
(Year Ended March 31)

	1987	1986	1985	1984	1983
		(millions of dollars)			
OPERATIONS					
Commercial revenue:					
Nuclear supply and services	97	93	146	196	219
Radiation equipment and isotopes	111	93	83	80	84
Investment	-	-	-	16	38
Interest	69	74	80	78	68
	277	260	309	370	409
Operating profit	22	28	8	15	26
Net Income	17	17	10	9	23
Research and development operations	233	212	224	211	194
FINANCIAL POSITION					
Cash and short-term deposits	58	55	123	121	136
Long-term receivables	597	699	748	767	741
Investment and deferred costs	108	110	112	104	99
Capital expenditures	28	23	30	35	37
Property, plant and equipment	54	52	55	54	99
Total assets	1,018	1,107	1,226	1,285	1,348
Long-term debt	623	649	722	781	801
Shareholder's equity	196	177	148	143	179
OTHER					
Parliamentary appropriations	218	275	326	336	315
Export revenues	150	141	145	195	217
Number of employees	5,007	5,540	6,767	6,978	7,327

Sources: Atomic Energy of Canada Ltd. Annual Reports.